

REMARKS/ARGUMENTS

Upon careful and complete consideration of the Office Action dated October 29, 2003, applicants have amended the claims which, when considered in conjunction with the comments herein below, are deemed to place the present application into condition for allowance. Favorable reconsideration of this application, as amended, is respectfully solicited.

The Office Action has rejected claims 1, 7-18, 22-24 and 26-27 under 35 U.S.C. §102 (b) as allegedly being anticipated by U.S. Patent No. 4,734,162 to Ampulski (hereinafter referred to as "Ampulski").

Before addressing either the present invention or Ampulski, it is respectfully submitted that it is axiomatic that anticipation under Section 102 requires that the prior art reference disclose every element of the claim. In re King, 801 F.2d 1324, 1326, 231 U.S.P.Q. 136, 138 (Fed. Cir. 1986). Thus, there may be no differences between the subject matter of the claim and the disclosure of the prior art reference. Stated in another way, the reference must contain within its four corners adequate directions to practice the invention. The corollary of this rule is equally applicable. The absence from the reference of any claimed element negates anticipation. Kolster Speedsteel AB v. Crucible Inc., 793 F.2d 1565, 1571, 230 U.S.P.Q. 81, 84 (Fed. Cir. 1986).

In making the above-noted rejection, the Office Action has alleged that:

"Ampulski teaches a process of making pulp in which a papermaking pulp, neutral to alkaline, is first cooked, digested with a solution containing SO₂ and NH₃ and then said cooked pulp is hydrolyzed by impregnating it with acid Ampulski teaches also the temperature and acidification time of the hydrolyzing steps of claims 7-18, which fall within the claimed range ... and teaches the separation of the pulp and the

hydrolyzed xylan and hemicellulose byproducts as claimed in claims 23-24 and 26 Ampulski teaches the use of birch as one of the preferred hardwood of claim 22 Regarding claim 27, Ampulski teaches also that the pulp can be used with other pulps to form a paper product....”

Applicants respectfully disagree.

To begin with, the present invention as now claimed in amended claim 1 is directed to a method of preparing chemical pulp and a xylose solution by the use of alkaline or neutral cooking and a post hydrolysis of the pulp, wherein the post hydrolysis is performed directly on the pulp by the use of an acid by post-hydrolyzing the pulp with an acid until a xylose yield of no less than 5% is obtained, while the viscosity of the pulp remains at a value of no less than 300 ml/g, followed by the recovery of chemical pulp and a xylose solution.

Ampulski relates to pulp produced by a process comprising combined ammonia and sulfur dioxide cooking (steps d-f) followed by hydrolysis at a pH of about 2 to about 3 (step g). The pulp obtained subsequent to step h of claim 1 is recited to have a xylan content of about 6% to about 8%. Pulps prepared by the process of Ampulski are recited to be especially useful as tissue paper webs having enhanced softness properties.

Contrary to the allegation made by the Office Action that Ampulski involves a neutral to alkaline cooking process, the Examiner’s attention is respectfully directed to the teaching of Ampulski at column 5, lines 33-35 and column 6, lines 34-36. On the basis of the recited amount of sulfur dioxide being present in the range of about 9 to about 14% and the recited pH range being from about 2 to about 3, it is clearly evident that Ampulski uses acid bisulfite cooking rather than neutral or alkaline cooking in accordance with the present invention. In fact, it is specifically recited at column 2, lines 13 –14 that Ampulski employs a specific acid bisulfite pulping process for making soft wood pulp fibers. Acid bisulfite cooking is also

taught by Ampulski at column 1, lines 22-40 and column 2, line 62. Clearly, Ampulski uses acidic cooking, whereas the present invention uses alkaline or neutral cooking.

Furthermore, Ampulski does not teach or suggest the recovery of a xylose solution as a result of its process. The process of the present invention, on the other hand, clearly recovers a separate xylose solution.

Still further, the Office Action in making a rejection of claims under 35 U.S.C. §103(a), acknowledged the fact that Ampulski failed to teach the different parameters such as viscosity of the pulp and xylose yield. Said parameters as found in original claim 2 have been incorporated into amended claim 1 by adding the phrase “by post-hydrolyzing the pulp with an acid until a xylose yield of no less than 5% is obtained, while the viscosity of the pulp remains at a value of no less than 300 ml/g”. Accordingly, it is respectfully submitted that Ampulski does not teach the xylose yield values and viscosity values as now found in claim 1. As such, Ampulski does not anticipate the claimed invention. Add to this the above-noted differences that Ampulski uses acid bisulfite cooking and does not teach xylose solution recovery and the rejection of the claims based on 102(b) must fall. Clearly King and Kolster Speedsteel show that Ampulski falls short of the anticipation standard of 35 U.S.C. §102(b).

Based on the amendments made to the claims, and the arguments submitted above, it is respectfully requested that the 102 (b) rejections of claims 1, 7-18, 22-24 and 26-27 based on Ampulski be withdrawn.

As briefly mentioned above, the Office Action has also made a rejection of claims under 35 U.S.C. §103(a), specifically rejecting claims 2-6 and 19-21 as being unpatentable over Ampulski. The arguments recited above with respect to the 102(b) rejection are reiterated here by reference thereto. Accordingly, it is respectfully submitted that claim 1 as

now amended is not rendered obvious in view of Ampulski in that Ampulski clearly relates to a process involving an acid bisulfite cooking step as opposed to the neutral or alkaline cooking step of the present invention and Ampulski does not teach the recovery of a xylose solution. Any process relying on the teachings of Ampulski would necessarily require acidic cooking and not be able to recover a xylose solution.

In making a rejection under 35 U.S.C. §103, the Office Action must take into account the total teachings of the reference. As stated by the CAFC, each prior art reference must be evaluated as an entirety, and all of the prior art must be evaluated as a whole. See *Panduit Corp. v. Dennison Mfg. Co.*, 774 F.2d 1082, 227 U.S.P.Q. 337 (Fed. Cir. 1985) and *EWP Corp. v. Reliance Universal Inc.*, 755 F.2d 898, 225 U.S.P.Q. 20 (Fed. Cir. 1985).

Consequently, it is respectfully submitted that one skilled in the art at the time the present invention was made who is only presented with Ampulski would not even attempt to employ a neutral or alkaline cooking step as Ampulski clearly teaches use of an acidic cooking step. Furthermore, Ampulski teaches the production of pulp comprising about 6% to about 8% xylan. Xylan is the non-hydrolyzed form of xylose. It is thus evident that xylan is not efficiently hydrolyzed to xylose in the process conditions taught by Ampulski. That is, the skilled artisan relying on Ampulski is not going to recover a separate xylose solution from the process as taught. Therefore, no matter what else Ampulski teaches, any rejection of the claims must fail based on the above-noted differences between the claimed invention and the process as taught by Ampulski. Consequently, it is respectfully requested that the rejection of the claims under 35 U.S.C. §103(a) be withdrawn as well.

Claims 1-27 have further been rejected by the Office Action under 35 U.S.C.

§103(a) as allegedly being unpatentable over International Publication No. WO98/56958 to Hyatt et al. (hereinafter referred to as “Hyatt et al.”) in view of Ampulski. In making this rejection, the Office Action noted:

“Hyatt et al. teach a process for recovering xylose from hardwood pulp in which an alkaline or neutral pulp is digested/cooked and the xylan contained in the pulp is hydrolyzed to xylose, see abstract. Hyatt et al. fail to teach the hydrolysis of the xylan directly on the pulp. However, Ampulski teaches that pulps can be hydrolyzed to obtain xylose, see above. Hydrolyzing the xylan contained in the pulp, either in the pulp or from the pulp filtrated is just a matter of convenience and not a technical deterrence.”

It is noted that Hyatt et al. is discussed in the subject specification on page 2. Here it is explained that Hyatt et al. disclose a method of preparing xylose by first extracting xylan from a cellulose pulp or its alkali solution with an aqueous solution of a xylanase enzyme and by then using acid to hydrolyze the xylan in the solution to xylose. However, the acid hydrolysis is not performed directly on the chemical pulp, and therefore all the xylan in the pulp cannot be utilized. The process of Hyatt et al. differs from the process of the present invention in that the post-hydrolysis is NOT carried out directly on the pulp, but xylan is first extracted from the pulp with an aqueous solution of a xylanase enzyme and the extract thus obtained is then subjected to hydrolysis with an acid to convert the xylan present in the solution to xylose. The Office Action is of the opinion that said difference is not obvious in view of the teachings of Ampulski. Applicants respectfully disagree. The process of Hyatt et al. is a much more complicated multistep process as compared to the process of the present invention wherein xylan is hydrolyzed directly in the pulp to xylose.

More particularly, it is respectfully submitted that one skilled in the art would not have expected that pulp prepared by alkaline or neutral cooking (as by the process of the present

invention) would have remained useful and maintained its characteristics as paper pulp or dissolved pulp in a post-hydrolysis step carried out directly on the pulp using an acid in accordance with the process of the present invention. In Hyatt et al. where alkaline cooking has been used for the production of pulp, xylan has been first extracted from the pulp and only thereafter xylan has been hydrolyzed to xylose. In other words, the post-treatment of hydrolyzing xylan to xylose has been carried out after the separation of the pulp. With respect to the present invention, it has been surprisingly found that it was possible to combine “xylan-protecting” alkaline or neutral cooking with subsequent direct post-hydrolysis of the pulp with an acid with the simultaneous extraction of xylan from the pulp and hydrolysis of xylan to xylose, without having any detrimental effects on the quality of the pulp.

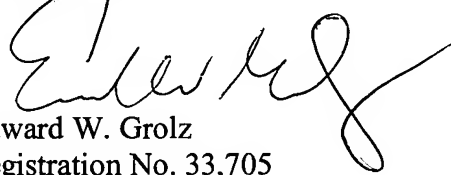
The Office Action has alleged that such a leap would have been obvious. Applicants respectfully disagree. Hydrolyzing the xylan directly in the pulp while maintaining good pulp properties cannot be considered obvious, because one skilled in the art would have expected that the acid post-hydrolysis performed in accordance with the process of the present invention would have resulted in the condensation of lignin and “black cooking”, i.e. the pulp would have been expected to have been destroyed in the acid hydrolysis step. As mentioned above, it was unexpectedly found in accordance with the process of the present invention that the characteristics of the pulp remained on an acceptable level. Further, by hydrolyzing the xylan directly in the pulp in accordance with the present invention, all the xylan present in the pulp can be utilized for the production of xylose. This provides a significant advantage over Hyatt et al.

Based on the arguments set forth above, it is respectfully requested that the rejection of the claims based on Hyatt et al. in view of Ampulski be withdrawn.

Claims 28-30 were rejected by the Office Action under 35 U.S.C. §102(b) as allegedly being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as allegedly obvious over Ampulski or Hyatt et al. It is noted that claims 28-30 have been deleted. Accordingly, this rejection is moot.

Finally, it is further submitted that all the claims in the application as presently submitted contain patentable subject matter and a Notice of Allowance is earnestly solicited.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Edward W. Grolz', with a long, sweeping horizontal stroke extending to the right.

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